

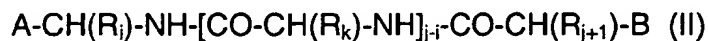
AMENDMENTS TO THE CLAIMS:

ALLOWED CLAIMS

Amend the claims as follows:

Claim 1. (Canceled)

2. (Currently Amended) A vaccine comprising an immunoretroid form of an immunologically active peptide, said immunoretroid being a derivative of said peptide which binds to an antibody or an antibody fragment to said peptide with at least an equal affinity as said peptide; wherein said immunoretroid form is a retro-inverso peptide or a retro-peptide of a peptide, wherein said immunoretroid form of said peptide has the following formula II:



wherein

n, which is the number of aminoacyl residues in formula II~~formula I~~, is 20a~~a whole number from 3-1,000~~, and R_i , R_k , and R_{j+1} are side chains of the aminoacyl residues,

i, j and k are whole numbers

wherein $1 \leq i \leq j < n$, and

if $i=j$, $k=0$; and

if $i < j$, $i+1 \leq k \leq j$;

such that,

where $i = 1$ and $j+1 = n$, A is Q and B is M;

where $i = 1$ and $j+1 \neq n$, A is Q and B is L;

where $i \neq 1$ and $j+1 = n$, A is T and B is M; and

where $i \neq 1$ and $j + 1 \neq n$, A is T and B is L;

Q being selected from the group consisting of H-, H_2N -, P-HN-, $RR'N$ -, H_2NCO -, $RR'NCO$ -, RCO-;

M being selected from the group consisting of H-, -COOH, -COOR, -CONH₂, -CONRR' and -NHCOR;

L being $-CO-NH-CH(R_{i+2})-CO-...-NH-CH(R_n)-CO-Y$

wherein Y is selected from the group consisting of -OH, -OR, -NH₂, and -NRR'; and

T being $X-HN-CH(R_1)-CO-...-NH-CH(R_{i-1})CO-NH-$

wherein X is selected from the group consisting of H-, P-, R- and RCO-;

wherein

R and R' are independently selected from the group consisting of hydrogen, C₁₋₂₅ alkyl, C₃₋₂₅ allyl, C₆₋₂₅ aryl, benzyl, 2-phenyl-ethyl, methyl-fluorenyl, glycolamide and benzhydrylglycolamide; and

P is a protecting group; and

and wherein said immunoretroid form is a retro-inverso peptide or a retro-peptide of a peptide selected from the group consisting of

FP peptide of serotype A12 of foot-and-mouth disease virus,

FL peptide of serotype A12 of foot-and-mouth disease virus,

SL peptide of serotype A12 of foot-and-mouth disease virus,

said vaccine further comprising a physiologically acceptable vehicle.

Claims 3-5. (Canceled)

2 ~~8~~. (Original) The vaccine of claim 2 wherein said immunoretroid form of said immunologically active peptide is bound to a liposome.

3 ~~1~~. (Original) The vaccine of claim 2 further comprising an adjuvant.

Claims 8-14. (Canceled)

4 ~~16~~. (Original) A vaccine of claim 2 wherein R and R' are independently selected from the group consisting of methyl, ethyl, isopropyl, tert-butyl and phenyl.

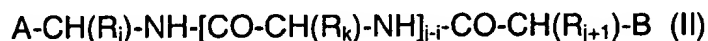
5 ~~18~~. (Original) A vaccine of claim 2 wherein P is selected from the group consisting of tert-butyloxycarbonyl, fluorenylmethyloxycarbonyl, benzyloxycarbonyl, and allyloxycarbonyl.

6 ~~17~~. (Original) A vaccine of claim 7 wherein R and R' are independently selected from the group consisting of methyl, ethyl, isopropyl, tert-butyl and phenyl.

7 ~~19~~. (Original) A vaccine of claim 7 wherein P is selected from the group consisting of tert-butyloxycarbonyl, fluorenylmethyloxycarbonyl, benzyloxycarbonyl, and allyloxycarbonyl.

Claims 19-25. (Canceled)

8 26. (new) A composition comprising an immunoretroid form of a peptide selected from the group consisting of FP peptide of serotype A12 of foot-and-mouth disease virus, FL peptide of serotype A12 of foot-and-mouth disease virus, and SL peptide of serotype A12 of foot-and-mouth disease virus, said immunoretroid being a derivative of said peptide which binds to an antibody or an antibody fragment to said peptide with at least an equal affinity as said peptide; wherein said immunoretroid form is a retro-inverso peptide or a retro-peptide of a peptide, wherein said immunoretroid form of said peptide has the following formula II:



wherein

n, which is the number of aminoacyl residues in formula II, is 20, and R_i , R_k , and R_{j+1} are side chains of the aminoacyl residues,

i, j and k are whole numbers

wherein $1 \leq i \leq j < n$, and

if $i=j$, $k=0$; and

if $i < j$, $i+1 \leq k \leq j$;

such that,

where $i = 1$ and $j+1 = n$, A is Q and B is M;

where $i = 1$ and $j+1 \neq n$, A is Q and B is L;

where $i \neq 1$ and $j+1 = n$, A is T and B is M; and

where $i \neq 1$ and $j+1 \neq n$, A is T and B is L;

Q being selected from the group consisting of H-, H_2N -, P-HN-, $RR'N$ -, H_2NCO -, $RR'NCO$ -, RCO -;

M being selected from the group consisting of H-, -COOH, -COOR, -CONH₂, -CONRR' and -NHCOR;

L being -CO-NH-CH(R_{i+2})-CO-...-NH-CH(R_n)-CO-Y
wherein Y is selected from the group consisting of -OH, -OR, -NH₂, and -NRR'; and

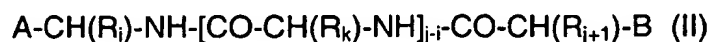
T being X-HN-CH(R₁)-CO-...-NH-CH(R_{i-1})-CO-NH-
wherein X is selected from the group consisting of H-, P-, R- and RCO-;
wherein

R and R' are independently selected from the group consisting of hydrogen, C₁₋₂₅ alkyl, C₃₋₂₅ allyl, C₆₋₂₅ aryl, benzyl, 2-phenyl-ethyl, methyl-fluorenyl, glycolamide and benzhydrylglycolamide; and

P is a protecting group;

said composition further comprising a diluent.

9 27. (new) A composition comprising an immunoretroid form of a peptide selected from the group consisting of FP peptide of serotype A12 of foot-and-mouth disease virus, FL peptide of serotype A12 of foot-and-mouth disease virus, and SL peptide of serotype A12 of foot-and-mouth disease virus, said immunoretroid being a derivative of said peptide which binds to an antibody or an antibody fragment to said peptide with at least an equal affinity as said peptide; wherein said immunoretroid form is a retro-inverso peptide or a retro-peptide of a peptide, wherein said immunoretroid form of said peptide has the following formula II:



wherein

n is 20,
i is a whole number in the range of 1-19,
j is a whole number in the range of 1-19,
k is 0 or whole number in the range of 2-19,
and R_i , R_k , and R_{j+1} are side chains of the aminoacyl residues of said SEQ ID
NO:7, SEQ ID NO:8 or SEQ ID NO:9,
wherein $1 \leq i \leq j < n$, and
if $i=j$, $k=0$; and
if $i < j$, $i+1 \leq k \leq j$;
such that,
where $i = 1$ and $j+1 = n$, A is Q and B is M;
where $i = 1$ and $j+1 \neq n$, A is Q and B is L;
where $i \neq 1$ and $j+1 = n$, A is T and B is M; and
where $i \neq 1$ and $j+1 \neq n$, A is T and B is L;
Q being selected from the group consisting of H-, H_2N -, P-HN-, $RR'N$ -, H_2NCO -,
 $RR'NCO$ -, RCO -;
M being selected from the group consisting of H-, $-COOH$ -, $-COOR$ -, $-CONH_2$ -,
 $CONRR'$ and $-NHCOR$;
L being $-CO-NH-CH(R_{j+2})-CO-...-NH-CH(R_n)-CO-Y$
wherein Y is selected from the group consisting of $-OH$ -, $-OR$ -, $-NH_2$ -, and $-NRR'$;
T being $X-HN-CH(R_1)-CO-...-NH-CH(R_{i-1})CO-NH$ -
wherein X is selected from the group consisting of H-, P-, R- and RCO -;
wherein

R_1 is CH_2SH , R_2 is H, R_3 is CH_2OH , R_4 is H, R_5 is $\text{CH}(\text{CH}_3)_2$, R_6 is $(\text{CH}_2)_3\text{NHC}(\text{NH})\text{NH}_2$, R_7 is H, R_8 is CH_2COOH , R_9 is $\text{CH}_2(\text{C}_6\text{H}_5)$ or CH_2OH , R_{10} is H, R_{11} is CH_2OH , R_{12} is $\text{CH}_2\text{CH}(\text{CH}_3)_2$, R_{13} is CH_3 , R_{14} is C_3H_6 or $\text{CH}_2\text{CH}(\text{CH}_3)_2$, R_{15} is $(\text{CH}_2)_3\text{NHC}(\text{NH})\text{NH}_2$, R_{16} is $\text{CH}(\text{CH}_3)_2$, R_{17} is CH_3 , R_{18} is $(\text{CH}_2)_3\text{NHC}(\text{NH})\text{NH}_2$, R_{19} is $\text{CH}_2\text{CH}_2\text{C}(\text{O})\text{NH}_2$ and R_{20} is $\text{CH}_2\text{CH}(\text{CH}_3)_2$,

R and R' are independently selected from the group consisting of hydrogen, C_{1-25} alkyl, C_{3-25} allyl, C_{6-25} aryl, benzyl, 2-phenyl-ethyl, methyl-fluorenyl, glycolamide and benzhydrylglycolamide;

P is a protecting group;

said composition further comprising a diluent.

~~10~~ 26. (new) The composition of claim 26 or claim 27 wherein said immunoretroid form of said immunologically active peptide is bound to a liposome.

~~11~~ 27. (new) The composition of claim 26 or claim 27 further comprising an adjuvant.

~~12~~ 28. (new) The composition of claim 26 or claim 27 wherein R and R' are independently selected from the group consisting of methyl, ethyl, isopropyl, tert-butyl and phenyl.

13 ~~31~~. (new) A composition of claim 26 or claim 27 wherein P is selected from the group consisting of tert-butyloxycarbonyl, fluorenylmethyloxycarbonyl, benzyloxycarbonyl, and allyloxycarbonyl.

14 ~~32~~. (new) The composition of claim 29 wherein R and R' are independently selected from the group consisting of methyl, ethyl, isopropyl, tert-butyl and phenyl.

15 ~~33~~. (new) The composition of claim 29 wherein P is selected from the group consisting of tert-butyloxycarbonyl, fluorenylmethyloxycarbonyl, benzyloxycarbonyl, and allyloxycarbonyl.